

A comparison of K-12 snack food guidelines developed by government and non-  
government organizations in the United States

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## **ABSTRACT**

Consumption of energy dense, nutrient poor foods and sweetened beverages are positively associated with overweight status in children (1). Excesses of fat and sugar are often found in snacks sold in a variety of convenient venues including school cafeterias and campus vending machines (2). A standard definition of what constitutes a ‘snack’ as well as a universally accepted guidance program for snacking in K-12 schools are lacking. This makes it difficult for nutrition professionals to evaluate food consumption patterns and develop guidance on what, when, and how many snacks are ideal for consumption by children in the United States.

The objectives of this study were to: 1) Analyze and compare snacking definitions and recommendations (frequency, foods suggested, nutrient composition) for children K – 12, developed by government and non-government organizations; 2) Evaluate the nutrient composition of snack items recommended and reimbursed by U.S. Federal government Child and Adult Food Care Program to children ages 6-12 in at-risk populations.

Snack definitions and recommendations, and their concordance with 2010 Dietary Guidelines for Americans for children K – 12, developed by a government (Child and

Adult Food Care Program-CACFP) and non-government (The Alliance for a Healthier Generation) organization, were compared. Qualitative methods were used to evaluate differences in snack definitions and recommendations. Quantitative methods were used to evaluate differences in nutrient composition between the six groups of snack items suggested by the Child and Adult Food Care Program based on nutrients provided per kilocalorie, and nutrients provided over the course of one week.

Results of this study suggest that processed and pre-packaged foods were promoted by the non-government organization; whole food and combined food groups were emphasized by the government organization. Significant differences were found between the nutrient composition of the six snack groups for the following nutrients: carbohydrates, protein, total fat, saturated fat, potassium, calcium, and vitamin D. These results demonstrate a need for variability in snack foods provided to the populations utilizing the government-subsidized snack food regulations in order to meet total nutrient requirements in concordance with the Dietary Guidelines for Americans. The results of this preliminary study will be used as a platform for further research in the area of K-12 snack food guidelines in the United States.

Dedicated to my parents for their encouragement and support.

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## **CHAPTER 1**

### **Introduction**

In the United States, it is projected that 55.5 million children are currently enrolled in the nation's elementary through high schools (3). With 40% of food consumed away from the home, the food choices of these 55.5 million students in public and private schools are of serious nutritional consequence (4). According to a survey of food intake by U.S. children, there have been large increases in snack consumption between 1989 and 2006 and indication of movement toward three snacks per day (5). In 2006, more than 27% of children's daily calorie intake came from snack foods (5). Often snacks are foods high in sugar and fats and result in the inadequate intake of fruits, vegetables and whole grains (6). The consumption of up to 3 high fat, high sugar snacks per day, for a total of approximately 27 percent of a person's daily caloric intake could contribute to poor nutrition and chronic diseases such as obesity. Although a direct causal effect of snacking on obesity has not been determined, more frequent snacking has been positively associated with adolescent increased body weight (1).

A standard definitions of "snack" or "snacking" is lacking. Although used in the vernacular of homes, schools, nutrition counseling, and even formal research, no "established" definition of "snack" exists, further, although no efforts have been made to



establish a universal definition of snacking in the United States, there has been a push toward the promotion of healthy snack food choices. Government programs such as the CACFP enforce guidelines for the selection of reimbursable snack foods by eligible parties in schools. Non-government guidance programs such as Snackwise<sup>®</sup>, Guiding Stars<sup>®</sup> and The Alliance for a Healthier Generation<sup>®</sup> provide general recommendations for choosing snacks wisely at vending machines, in grocery stores, and in after school programs or day care facilities. These guidance programs make varied recommendations for the selection of snack foods which can ultimately affect the overall nutrient intake and body weight status of the nation's children.

The objectives of this study were to: 1) Analyze and compare snacking definitions and recommendations (frequency, foods suggested, nutrient composition) for children K – 12, developed by government and non-government organizations; 2) Evaluate the nutrient composition of snack items recommended and reimbursed by U.S. Federal government Child and Adult Food Care Program to children ages 6-12 in at-risk populations.

## **CHAPTER 2**

### **Review of Literature**

#### Snack Definitions

Despite its common use in household conversations, scientific literature, in nutrition guidelines and clinical settings, a standard definition of the term “snack” is lacking. In a nation where snacking constitutes a substantial portion of the population’s kilocalorie and essential nutrient intake, the lack of a universally accepted snack food definition makes it difficult to formulate consistent dietary guidelines, evaluate food consumption patterns, and interpret scientific literature. There is a public health and dietary significance to snacking; to properly advise the nation on meal patterns and conduct further research on the topic, a national consensus on the meaning of “snack” is needed.

Various nutrition studies and scientific journal articles focus on meal patterns such as snacking and the effect it has on energy and nutrient intake. In a PubMed search of the words “snack” and “obes” limited to papers written in English from April 2003 to April 2006 on children from infancy to 18 years old, only 42.3% of the matching journal articles about child snacking and obesity contained a clear definition of “snack” (7). Definitions varied greatly in articles that do include an explicit definition of snack or snacking. The negative impact of snacking on nutrition status poses a clear public health

concern warranting further research and recommendations for snacking behavior.

However, in order to properly advise the nation and analyze scientific studies, there must be a national consensus on the definition of a “snack.”

Among the multiple ways to define a snack or snacking occasion is by *food type*. This includes categorization by nutrient content or nutrient density. An example includes the designation “Foods of Minimal Nutrition Value (FMNV).” According to the United States Department of Agriculture (USDA), FMNV include: (1) Soda Water (2) Water Ices (3) Chewing Gum and (4) Certain Candies (School Meals: Appendix B of 7 CFR Part 210). These FMNV and other “snacks” fall under the category of *competitive foods* which are defined by the USDA as foods that are sold in competition with the USDA’s school meal programs such as a la carte stands, vending machines and snack shops (8).

Another form of defining snacks is by *when* they are eaten. With meals defined as groups of foods eaten between the hours of 8-10am, 12-2pm and 6-8pm, snacks constitute those foods that are eaten outside of the mealtime. There are inherent problems using this approach since meal patterns and time of consumption vary greatly between people (shift workers, different cultures, etc.) (8).

Other methods of defining snacks include *food clusters*, which defines a snack as groups of food eaten together regardless of time of day or nutrient content; *eating frequency*, which uses the assumption that frequency of snacking is proportional to the number of eating occasions in a day; and *self-reporting*, where participants report a food item as a “snack” in a survey or food diary (8). The plethora of classifications identified in scientific literature demonstrates the need for consistency regarding the term “snack”.

## Snack Recommendations

Despite the lack of an agreed upon definition of the term “snack,” many programs exist to guide the population on how to choose nutritious or appropriate snacks. Strict criteria on what and how to choose a snack wisely are given. Government based guidelines include Dietary Guidelines for Americans, which are used to translate nutrient requirements into food and meal requirements for Federal Food Assistance Programs. In the Dietary Guidelines for Americans section on “promoting calorie balance and weight management,” it is stated that behaviors such as snacking and frequency of eating have been studied, “but there is currently not enough evidence to support a specific recommendation for these behaviors to help manage body weight” (9). Nonetheless, strategies for making healthy choices when snacking are still provided. These include having healthy snacks available at home and carrying nutrient-dense snacks on the go as well as using raw fruits and vegetables as snacks (9). These recommendations demonstrate an emphasis on using whole foods as healthy “snacks.”

In addition to the Dietary Guidelines for Americans 2010, the USDA Food and Nutrition Service (FNS) has a program called the Child and Adult Food Care Program (CACFP) whose aim is to serve nutritious meals and snacks to low income families based on their Income Eligibility Guidelines (IEGs). The CACFP is authorized in section 17 of the National School Lunch Act (42 U.S.C. 1766). Program regulations are issued by the USDA under 7 CFR part 226. This program supplies healthy snacks to children in public schools, day cares and after school facilities where at least 50% of the children are eligible for free and reduced lunch. The USDA’s Food and Nutrition Service reimburses schools participating in CACFP through grants to individual states. Independent after

school or day care centers enter into contracts with state agencies (10).

Other federal support for healthy snacks includes efforts by the Obama Administration to implement new guidelines for school vending machines. Since students eat 19-50% of their daily food at school, and an estimated \$2.3 billion worth of snack foods and beverages are sold annually in schools nationwide, the consumption of snack food by children in the United States has been noted as a threat to public health (11).

In addition to these federal guidelines, non-government organizations have developed programs to guide healthier decisions for those groups who are not eligible for government assistance. Examples include: SnackWise<sup>®</sup>, Guiding Stars<sup>®</sup>, or Alliance for a Healthier Generation<sup>®</sup>. Unlike federally sponsored programs, schools, companies or individuals that follow the guidelines set out by these non-government recommendations are not legally required to uphold the outlined specifications.

The Snackwise<sup>®</sup> Nutrition Rating System is a software program developed by the Center for Healthy Weight and Nutrition at Nationwide Children's Hospital in Columbus, Ohio. Scores are used to calculate a nutrient density score for snack items using 11 parameters from the nutrition facts label. Snacks are grouped into three identifiable categories: "green" items that should be chosen most often, "yellow" items that should be chosen occasionally, and "red" items that should be chosen least often. Developers of Snackwise suggest the following guidelines in vending machines to promote healthy snacking: 30% green, 55% yellow, and 15% red (12).

The Guiding Stars Program<sup>®</sup> is another system that rates foods based on nutrient density using a scientific algorithm. This rating system is implemented in grocery stores

and foods are marked with tags showing 0, 1, 2, or 3 stars. The higher the nutritional value of the food, the more stars it receives on the item's grocery store price label. The program claims to point consumers toward foods that have higher micronutrient content and less fat, sugar and sodium (13).

Finally, The Alliance for a Healthier Generation<sup>®</sup> is a program, which purports to provide snack food guidelines to schools that would like to improve the overall nutritional status of their children. This program consolidates its resources, tools and product listings on its website, [healthiergeneration.org](http://healthiergeneration.org) and schools may navigate the website and utilize these tools as they so choose. The program does not rate products like The Guiding Stars Program<sup>®</sup> or Snackwise<sup>®</sup>, but rather lists manufactured food products that meet their restrictive nutrient and calorie criteria outlined in the Healthy Schools Program Competitive Food Guidelines (14).

In an attempt to improve the overall nutrition status of the K-12 population in the United States, various strategies for promoting healthy snack food consumption have been proposed by both government and non-government entities, and compared snack food definitions and recommendations among these programs have not been evaluated. Similarly, nutrients provided by various programs have not been explored, particularly in comparison with 2010 Dietary Guidelines for Americans. Therefore, the purpose of this study was to: 1) Analyze and compare snacking definitions and recommendations (frequency, foods suggested, nutrient composition) for children K – 12, developed by government and non-government organizations; 2) Evaluate the nutrient composition of snack items recommended and reimbursed by U.S. Federal government CACFP to children ages 6-12 in at-risk populations.

## **CHAPTER 3**

### **Methodology**

#### Snack Food Definitions and Recommendations

The government and non-government K-12 snack food guidance programs chosen for a comparative analysis were the CACFP and Alliance for a Healthier Generation (AHG), respectively. These two programs were chosen based on their widespread implementation in the United States K-12 population and inclusion of recommendations specifically for “snack” foods.

#### **1. CACFP**

The CACFP is a plan implemented by the USDA FNS to assist the nation’s most nutritionally at-risk children in meeting national nutrition recommendations. The guidelines of the CACFP are intended to fall in concordance with current Dietary Guidelines for Americans and the Dietary Reference Intakes (DRIs). Eligible populations for the CACFP include preschool children, children younger than 12 years old in child care centers and homes, and older children in at-risk afterschool programs, low-income areas and emergency shelters. As a result, the locations of meal or snack distribution are wide-ranging and include large day care facilities, head start schools, and after school programs. The CACFP serves approximately 3.2 million children annually and has the potential to provide over half of the day’s calorie recommendations for some participants

by sponsoring two meals and a snack, or two snacks and a meal. In 2010, the total costs for the program were about \$2.2 billion (15).

CACFP recommendations are made for specific age groups corresponding to their total daily calorie requirements outlined in the Dietary Guidelines for Americans.

According to this guidance program, a snack consists of a combination of two of the four following food groups:

- 1) fruit/vegetable,
- 2) grains/breads,
- 3) lean meat/meat alternate,
- 4) milk.

As a result, there are six total possible permutations for one snack:

- 1) fruit/vegetable and grains/breads,
- 2) fruit/vegetable and lean meat/meat alternate,
- 3) fruit/vegetable and milk,
- 4) grains/breads and lean meat/meat alternate,
- 5) grains/breads and milk, or
- 6) lean meat/meat alternate and milk.

The suggested serving sizes vary by age group (ages 1-2, ages 3-5 and ages 6-12) and the recommendations specify “children over 12 years old may be served larger portions based on their greater food needs” (Figure 1). As an example, an 8 year old participant would be eligible for a snack comprised of one  $\frac{3}{4}$  cup serving from the fruit/vegetable group as well as a 1 cup serving from the milk group. The combination of



these two items would be equivalent to one reimbursable snack for an 8 year-old as outlined by the CACFP Child Snack Guidelines (16).

Figure 1: Child Meal Pattern: Snack

Child Meal Pattern Snack			
Select Two of the Four Components for a Reimbursable Snack			
Food Components	Ages 1-2	Ages 3-5	Ages 6-12 <sup>1</sup>
<b>1 milk</b> fluid milk	1/2 cup	1/2 cup	1 cup
<b>1 fruit/vegetable</b> juice, <sup>2</sup> fruit and/or vegetable	1/2 cup	1/2 cup	3/4 cup
<b>1 grains/bread<sup>3</sup></b> bread or cornbread or biscuit or roll or muffin or cold dry cereal or hot cooked cereal or pasta or noodles or grains	1/2 slice 1/2 serving 1/4 cup 1/4 cup 1/4 cup	1/2 slice 1/2 serving 1/3 cup 1/4 cup 1/4 cup	1 slice 1 serving 3/4 cup 1/2 cup 1/2 cup
<b>1 meat/meat alternate</b> meat or poultry or fish <sup>4</sup> or alternate protein product or cheese or egg <sup>5</sup> or cooked dry beans or peas or peanut or other nut or seed butters or nuts and/or seeds or yogurt <sup>6</sup>	1/2 ounce 1/2 ounce 1/2 ounce 1/2 egg 1/8 cup 1 Tbsp. 1/2 ounce 2 ounces	1/2 ounce 1/2 ounce 1/2 ounce 1/2 egg 1/8 cup 1 Tbsp. 1/2 ounce 2 ounces	1 ounce 1 ounce 1 ounce 1/2 egg 1/4 cup 2 Tbsp. 1 ounce 4 ounces
<sup>1</sup> Children age 12 and older may be served larger portions based on their greater food needs. They may not be served less than the minimum quantities listed in this column. <sup>2</sup> Fruit or vegetable juice must be full-strength. Juice cannot be served when milk is the only other snack component. <sup>3</sup> Breads and grains must be made from whole-grain or enriched meal or flour. Cereal must be whole-grain or enriched or fortified. <sup>4</sup> A serving consists of the edible portion of cooked lean meat or poultry or fish. <sup>5</sup> One-half egg meets the required minimum amount (one ounce or less) of meat alternate. <sup>6</sup> Yogurt may be plain or flavored, unsweetened or sweetened.			

It is important to note that an “Afterschool Care Snack Cycle Menu” is available for use by participants. Although difficult to locate on the site, this menu provides options for both limited and traditional kitchens. An example is shown in Figure 2 (17):

Figure 2: Limited Kitchen Facilities Menus - Week 1

	Participants Ages 6 - 12 Years	Participants Ages 13 - 18 Years
<b>Mon</b>	Lowfat milk (8 oz.) *Sliced peaches in light syrup (3/4 c.)	Lowfat milk (8 oz.) *Sliced peaches in light syrup (3/4 c.) Corn muffin (A-02) (1.1 oz.) (O)
<b>Tue</b>	Lowfat chocolate milk (8 oz.) Granola bar (2.2 oz.)	Lowfat chocolate milk (8 oz.) Granola bar (2.2 oz.) *Apple slices (1 med.) (O)
<b>Wed</b>	Grape juice (3/4 c.) *Reduced-Fat American cheese cubes (1 oz.)	Grape juice (3/4 c.) *Reduced-Fat American cheese cubes (1 oz.) Whole wheat crackers (.7 oz.) (O)
<b>Thu</b>	Soft Pretzel (.9 oz.) Broccoli florets (3/4 c.) w/ lowfat French salad dressing (2 tbsp.) Water	Soft Pretzel (.9 oz.) Broccoli florets (3/4 c.) w/ lowfat French salad dressing (2 tbsp.) *Turkey slices (1.6 oz.) (O) Water
<b>Fri</b>	Lowfat milk (8 oz.) *Orange (1 med.)	Lowfat milk (8 oz.) *Orange (1 med.) Peanuts (1 oz.) (O)

## 2. The Alliance for a Healthy Generation

The Alliance for a Healthy Generation is a non-governmental national food program implemented through voluntary participation in K-12 schools in the United States. The aim of the Alliance for a Healthier Generation is to assist with addressing the nation's childhood obesity epidemic. The program was founded in 2005 by the American Heart Association and the William J. Clinton Foundation and also receives funding from the Robert Wood Johnson Foundation. The mission of Alliance is noted to be to “reduce the nationwide prevalence of childhood obesity by 2015 and to empower kids nationwide to make healthy lifestyle choices.” The Alliance for a Healthy Generation Healthy Schools Program claims to support more than 14,000 schools in all 50 states in the U.S.. Any school in the U.S. can enroll in the Healthy Schools Program at no cost and free resources and assistance are provided through the website, [www.HealthierGeneration.org](http://www.HealthierGeneration.org) (14).

Since 2006, The Alliance for a Healthier Generation has been forming partnerships with the food, beverage, dairy and food service management industries. The

*Healthy Schools Product Calculator* and *Product Navigator* are internet-based products designed to assist participating schools to browse the competitive food items of over 20 participating food manufacturers. Product ordering information is also provided; products listed conform to the Alliance for a Healthier Generation Competitive (Snack) Food Guidelines. A school that utilizes these tools does so voluntarily and is not legally bound to adhere to the guidelines or purchase the products listed in the Product Navigator.

The Alliance for a Healthier Generation guidelines were designed to help schools make more conscious snack food purchases. The Competitive Foods Guidelines cover “foods offered outside of the reimbursable meal program such as products sold in school vending machines, a la carte lines, snack bars, fundraisers, and school stores.”

Specific guidelines include:

- 1) No more than 35% of calories from total fat
- 2) No more than 10% of calories from saturated fat
- 3) No more than 35% sugar by weight
- 4) Calories per snack portion size are limited, based on grade levels.
  - a. Less than 150 calories or less for elementary schools
  - b. Less than 180 calories or less for middle schools
  - c. Less than 200 calories or less for high schools
- 5) Contain no more than 230 milligrams of sodium per snack portion.
- 6) Contain zero trans fat.

This guidance program was designed with the Dietary Guidelines for Americans as well as the American Heart Association’s Dietary Guidelines for Healthy Children and 2006 Diet and Lifestyle Recommendations in mind (14). The stated goal of the snack

food guidelines is to balance nutritional needs with weight management and promote a positive and healthy school and after-school environment for students.

Qualitative analyses were conducted to explore how CACFP and AHG define the term snack and evaluate differences in snack food guidelines as provided by CACFP and AHG. Eight specific criteria were used to conduct this analysis: 1) Purpose, 2) Guidelines, 3) Eligibility requirements, 4) Reach, 5) Collaborations/ Sponsors, 6) Specific nutrient criteria, 7) Food group, and 8) Age-related specifications.

#### Nutrient Composition of Snack Food Offerings (CACFP):

To quantify the types and amounts of nutrients supplied to students through the CACFP guidance program, a representative sample of the possible snack foods offered by participating schools was selected. There is no discrete listing of compliant snack food items for CACFP, therefore the snacks were chosen based on foods typically available to and served by low-income elementary schools with limited kitchens in the United States (17). For this analysis, the snacks adhere to CACFP snack food criteria (serving size and food type) for children ages 6-12.

In the CACFP program, a snack consists of a combination of two of the four following food groups: 1) fruit/vegetable, 2) grains/breads, 3) lean meat/meat alternate, and 4) milk. As a result, there are six total possible permutations for one snack: 1) fruit/vegetable and grains/breads, 2) fruit/vegetable and lean meat/meat alternate, 3) fruit/vegetable and milk, 4) grains/breads and lean meat/meat alternate, 5) grains/breads and milk, or 6) lean meat/meat alternate and milk. In order to mimic a representative sample for each of the six snack permutations, 3 hypothetical “high” and 3 hypothetical “low” nutrient density snack examples were chosen for each group, resulting in a total of

36 products. The six products in each snack group were chosen with the intent to create a mean calorie/nutrient content for that group.

The nutrient composition of the selected snack examples was completed using the USDA Nutrient Database for Standard Reference, an interface that allows simple searches for food ingredients by entering keywords or the Nutrient Database Number (18). The nutrient composition documented was based on the eleven Dietary Guidelines for Americans' Nutrients of Concern: calories, carbohydrates, protein, total fat, saturated fat, trans fat, sodium, sugar, potassium, dietary fiber, calcium, and vitamin D (9).

### *Data Analysis*

Data was analyzed using the SPSS statistics software program. Descriptive statistics for all variables were completed. The 11-point nutrient content of each snack item was normalized per 1 kcal to give a clear standard for comparison between items of various serving size in a group and groups within the CACFP guidance program. Means and standard deviations were calculated for calories and nutrients in each snack group. To test for statistically significant differences in nutrient composition between snack groups 1-6 of the CACFP program, an analysis of variance (ANOVA) test was run using a p-value of 0.05 as a marker for statistical significance. For nutrients displaying statistically significant differences between groups, Tukey's post-hoc multiple comparison test was used to determine which groups were significantly different from one another.

### *Internal Validity*

This research is a pilot investigation and is not intended for generalization to the U.S. K-12 population as a whole. The guidelines used for in this study were chosen based

on their widespread reach and parallel components for comparison. The results of the study are not intended to be a valid representation of child snack food consumption in the United States, but are designed to gain insight for further research.

## **CHAPTER 4**

### **Results**

#### **“Snack” Definitions:**

The CACFP and AHG provide their own definitions for what qualifies as a “snack” within their guidance programs. The CACFP defines an “at-risk afterschool snack” as a snack that meets the requirements described in §226.20 (c)(4) and is provided at the free rate for snacks and is served by an eligible at-risk afterschool care center as defined in the same section. Section §226.20 (c)(4) states: “Meal supplements shall contain two different components from the following four: i) A serving of fluid milk as a beverage, or on cereal, or used in part for each purpose, ii) a serving of meat or meat alternate, iii) A serving of vegetable(s) or fruit(s) or full-strength vegetable or fruit juice, or an equivalent quantity of any combination of these foods, iv) a serving of whole-grain or enriched bread; or an equivalent serving of cornbread, biscuits, rolls, muffins, etc. (19).

The AHG guidelines state that snacks include “foods offered outside of the reimbursable meal program such as products sold in school vending machines, a la carte lines, snack bars, fundraisers, and school stores.” In the Healthy Schools Program, snacks include: bars, chips, crackers, pretzels, popcorn, nuts & trail mix and an additional “snacks” category containing items such as yogurt, ice cream, potato products and soups.

The program provides a discrete list of compatible processed food products in their online *Product Navigator*. (14)

In the Child and Adult Food Care Program, specific foods to be included in a “snack” are specified by food group. The AHG provides a definition of “snack” based on common categories in manufactured food products and venue (vending machines, school stores, etc.).

### Snack Food Recommendations

Differences were found between the government and non-government snack food guidance programs in the following categories: 1) program purpose, 2) eligibility requirements, 3) funding and partnerships, 4) nutrient criteria, 5) food groupings. Results are summarized in Table 1.

#### 1. Program purpose

The purpose of the CACFP is to meet the nutrition needs of children, K-12, as suggested by the Dietary Guidelines for Americans. The claim of the AHG is to combat the escalating obesity epidemic in the United States.

#### 2. Eligibility Requirements

Differences were also observed in the guidance programs’ eligibility requirements. In order to be eligible for assistance by the CACFP, there are age requirements, income requirements, and requirements based on participation in other programs (10). Specific requirements are outlined in section 226.2 of the CACFP Rules and Regulations:



Age Limits: *Children* means "(a) Persons age 12 and under; (b) Persons age 15 and under who are children of migrant workers; (c) Persons of any age who have one or more disabilities, as determined by the State, and who are enrolled in an institution or child care facility serving a majority of persons who are age 18 and under; (d) For emergency shelters, persons age 18 and under; and (e) For at-risk afterschool care centers, persons age 18 and under at the start of the school year."

Income Requirements: In centers, participants from households with incomes at or below 130 percent of poverty are eligible for free meals. Participants in centers with household incomes between 130 percent and 185 percent of poverty are eligible for meals at a reduced price. Institutions must determine each enrolled participant's eligibility for free and reduced price meals served in centers.

Participation in other programs: Children whose families receive benefits from the Supplemental Nutrition Assistance Program (SNAP), Food Distribution Program on Indian Reservations (FDPIR), or State programs funded through Temporary Assistance for Needy Families (TANF) are categorically eligible for free meals. Children who are participants of Head Start or Even Start programs are automatically eligible for free meals, without further application or eligibility determination. Foster children who are the responsibility of the State or placed by the court, and children who are experiencing homelessness are also automatically eligible for free meals.

In contrast, there are no eligibility requirements to participate in The AHG Healthy Schools Program. Any school interested in using the resources of AHG may visit

the website to peruse their snack food guidelines, product navigator and tips for serving healthier items at their own will. Schools may participate in the framework of the Healthy Schools Program and/or implement the guidelines to as little or great extent as they wish.

### 3. Funding and Partnerships

The CACFP is a federally funded program. States manage the Federal Child Nutrition Programs. In order for a school, afterschool care program, day care, emergency shelter or other eligible institution to participate, they must contact their state agency (20). This state agency is responsible for proper implementation and adherence by the participating entities. In addition to being a part of the USDA's FNS, the CACFP seeks to remain consistent with the 2010 Dietary Guidelines For Americans. The CACFP maintains no partnerships and receives no funding outside the U.S. government.

The AHG is a privately-funded non-government organization founded by the William J. Clinton Foundation and the American Heart Association. The Healthy Schools program receives the majority of its funding from the Robert Wood Johnson Foundation (21). The AHG also partners with over at least 70 major food manufacturers and group purchasing organizations, including Kraft Foods, Mars, Inc. and PepsiCo, Inc..

### 4. Nutrient Criteria

The CACFP does not provide specific nutrient criteria for their snack items, but does so indirectly by placing limits on serving sizes and food groups. The AHG does give specific restrictive criteria for their seven snack food categories, focusing on percent calories from sugar, percent calories from fat, sodium, trans fat and calorie restrictions based on age group.

## 5. Food Groupings

The CACFP uses food grouping to describe eligible snacks. Two items out of four main food groups (milk, fruit/vegetable, grains/bread, meat/meat alternate) comprise one reimbursable snack item. These food groupings correlate with those historically published on the USDA MyPlate (formerly MyPyramid) program and allude to using whole food products.

The AHG recommends participants select products from seven categories of manufactured foods for “snacks”: bars, chips, crackers, popcorn, pretzels, nuts & trail mix, and an additional “snacks” category.

Table 1: Snack Food Recommendations

Program	Purpose	Guidelines	Eligibility	Reach	Collaborators/ Sponsors	Nutrient Criteria	Food Groups	Age-related recommendations
<b>Child and Adult Care Food Program (CACFP)</b>	"To safeguard the health and well being of our Nation's Children."	National School Lunch Program <sup>1</sup> , Dietary Guidelines for Americans	<p>Children whose families receive benefits from the</p> <ul style="list-style-type: none"> <li>Supplemental Nutrition Assistance Program (SNAP),</li> <li>Food Distribution Program on Indian Reservations (FDPIR),</li> <li>State programs funded through Temporary Assistance for Needy Families (TANF)</li> </ul> <p>Children who are participants of</p> <ul style="list-style-type: none"> <li>Head Start</li> <li>Even Start programs.</li> </ul>	Serves <b>3.2 million children</b> in the U.S	USDA, Food and Nutrition Service, Institute of Medicine	<p>Must provide <i>minimum</i> serving size listed in guideline.</p> <p>Must be composed of two of the four food components outlined in §226.20.</p>	<p>4 food components (§226.20):</p> <ol style="list-style-type: none"> <li>1) Milk</li> <li>2) Fruit/vegetable</li> <li>3) Grains/ bread</li> <li>4) Meat/ meat alternate</li> </ol>	<p>Serving size increases with age. Categories are as follows:</p> <ol style="list-style-type: none"> <li>1) 1-2,</li> <li>2) 3-5</li> <li>3) 6-12</li> <li>4) 13+ years old</li> </ol>
<b>Alliance for a Healthier Generation (AHG) Healthy Schools Program Table 1:</b>	"To reduce the nationwide prevalence of childhood obesity by 2015 and to empower kids nationwide to make healthy lifestyle choices."	Dietary Guidelines for Americans	Any school may participate of their own will.	Claims to provide resources & tools to over <b>14,000 U.S. schools</b>	<p>Funding: Robert Wood Johnson Foundation, William J Clinton Foundation, The American Heart Association</p> <p>Participating food manufacturers: Campbell Soup Company, The Dannon Company, Inc, Kraft Foods Global, Inc., Masterfoods USA, A division of Mars, Inc., and PepsiCo, Inc.</p>	<p>Includes calorie restrictions and serving sizes by age category.</p> <p>&lt;180 kcal for Elementary School &lt;35% calories from total fat (zero trans fat) &lt;10% calories from saturated fat &lt;35% sugar by weight &lt;230 mg sodium per snack portion</p>	<p>7 categories:</p> <ol style="list-style-type: none"> <li>1) Bars</li> <li>2) Chips</li> <li>3) Crackers</li> <li>4) Nuts &amp; trail mix</li> <li>5) Popcorn</li> <li>6) Pretzels</li> <li>7) Snacks</li> </ol>	<p>Nutrient restrictions and serving sizes vary with age. Categories are as follows:</p> <ol style="list-style-type: none"> <li>1) Elementary school</li> <li>2) Middle school,</li> <li>3) High school</li> </ol>

<sup>1</sup> CACFP is authorized at section 17 of the National School Lunch Act (42 U.S.C. 1766). Program regulations are issued by the U.S. Department of Agriculture (USDA) under 7 CFR part 226.

## Evaluation of Nutrient Composition of CACFP Snack Groups

Statistically significant differences in nutrient content were found among the six CACFP food groups. Based on a p-value of 0.05, groups were significantly different from one another for the following nutrients: carbohydrate, protein, total fat, saturated fat, potassium, calcium, and vitamin D. Tukey's post-hoc multiple comparison test was used to identify the source of significant differences for each nutrient. These differences are noted in Table 2.

Column 1 lists the nutrients of concern used for comparative analysis. Columns 2-7 list the mean values for the nutrients listed in column 1, normalized per 1kcal. The asterisks in column 1 indicate that the following nutrients demonstrated statistically significant values between the six snack groups: carbohydrate, protein, total fat, saturated fat, potassium, calcium, vitamin D. The unique symbols in columns 2-7 indicate between which groups the significance lies, based on the post-hoc multiple comparison test and a p-value of 0.05. Take carbohydrates, for example: groups 1, 3, and 4 had values significantly different from each other, indicated by the • symbol; groups 2 and 4 had values significantly different from each other, as indicated by the ■ symbol; groups 3, 4 and 6 had values significantly different from each other, as indicated by the ◆ symbol.

An 82.5 calorie difference existed between the highest and lowest food group combinations composing one CACFP “snack” (Table 3). Group 6 (meat/meat alternate and grains/bread) had the lowest mean calories (185.5 kcal). In contrast, Group 1 (milk and fruit/vegetable) provided the highest average calories (268.1 kcal). However, these differences were not statistically significant differences.

Table 2: Nutrient Composition of CACFP Snack Groups

<b>Snack Group</b> <b>Nutrient/kcal</b>	1 Milk, Fruit	2 Milk, grain/bread	3 Milk, meat/meat alternate	4 Fruit, grain/bread	5 Fruit, meat/meat alternate	6 Meat/meat alternate, grain/bread
Carbohydrate/kcal*	0.1732•	0.1503■	0.0902•♦	0.2453•■♦	0.1675	0.1339♦
Protein/kcal*	0.0396	0.0490	0.0680•	0.193•	0.0408	0.0549
Total Fat/kcal*	0.0176	0.0240	0.0384•	0.0089•■	0.0280	0.0380■
Saturated Fat/kcal*	0.0104	0.0118•	0.0182■	0.0012•■♦	0.0098	0.0118♦
Sodium/kcal	0.6068	1.1473	1.6290	0.7338	1.2453	2.1514
Sugar/kcal	0.1011	0.0572	0.0624	0.1025	0.1003	0.0391
Potassium/kcal*	2.4985•	2.0898	2.3693	1.4268	1.6862	1.1031•
Dietary Fiber/kcal	0.0087	0.0206	0.0016	0.0375	0.0118	0.0268
Calcium/kcal*	1.3782	1.6822•♦⊙	1.6905■♦⊙	0.5326•■♦	0.4640•■⊙	0.8450
Vitamin D/kcal*	0.3922•⊙⊙⊕	0.4379•⊙⊙⊕	0.4488■⊙⊙⊕	0.0228•♦■⊙	0.0045•♦■⊙	0.0324•♦■⊕

\*- nutrient displaying significant differences across 6 snack groups

•■♦⊙⊕- represent significant differences between groups carrying the same symbol in a particular nutrient row

Table 3: Average calories provided by CACFP snack food groups

Group	N	Food Groups	Observed Mean Calories
6	6	Meat/meat alternate, grain/bread	185.5000
4	6	Fruit, grain/bread	199.3850
5	6	Fruit, meat/meat alternate	202.5517
2	6	Milk, grain/bread	251.0350
3	6	Milk, meat/meat alternate	254.2017
1	6	Milk, Fruit	268.0867
Significance			.585

## **CHAPTER 5**

### **Discussion**

#### *Snack food definitions*

The CACFP defines a snack based on food groups (milk, vegetable, fruit, grain, meat) as well as serving size, by age category. According to their guidelines for Child Snack, a snack must be composed of two of their four outlined food groups, however a discrete list of choices is not available. Therefore, if a food item is assumed to meet the food category and adheres to the serving size requirements, it is eligible for reimbursement, regardless of nutrient content. As demonstrated by this investigation, schools could select products with high nutrient quality (low sugar, low fat, high in essential micronutrients) or products with low nutrient quality (high sugar, high fat, low in essential micronutrients) based on how they interpret the guidelines and what they have available in their facilities. Although serving sizes are given per age group, there are no restrictive guidelines for sugar, fat, sodium and calories.

The AHG defines a snack by time of day and/or location: “foods offered outside of the reimbursable meal program such as products sold in school vending machines, a la carte lines, snack bars, fundraisers, and school stores.” The aforementioned snack venues allude to processed snack food products rather than the whole food groups listed by the CACFP. In addition, the food groups the AHG generally promotes are all pre-packaged

products: bars, chips, crackers, pretzels, popcorn, nuts & trail mix, and “snacks.” This definition of a snack already narrows the spectrum of compliant items far more than CACFP, and the specific nutrient criteria, restrictions on sugar, fat, sodium and calories, narrows it even more.

The difference between these government and non-government definitions of what is a snack model two very different perspectives on what constitutes a “snack.” In a school eligible for the CACFP, which defines a snack as a combination of two of the four major food groups (milk, grains, fruit/veg, meat), children are given a snack, with the apparent intent that this snack be a whole food product. On the contrary, in a school that employs the tools of AHG such as their *Product Navigator*, the majority of “healthy” snacks are pre-packaged, processed foods the likes of which are available in school snack shops and vending machines. As a result, children are receiving mixed messages about what is a “snack.” This could carry implications for eating patterns throughout life.

#### *Program Purpose*

The study suggests that the CACFP and The AHG are approaching the issue of child nutrition from opposite standpoints. While the CACFP works to meet the minimum nutrition needs of children, the AHG claims to combat the childhood obesity epidemic.

#### *Eligibility requirements*

The CACFP provides guidelines to eligible schools and institutions that are contractually bound to uphold the nutrient requirements and restrictions for snack foods in order to receive federal subsidies. In contrast, the AHG proposes guidelines for what a school *should* purchase, however it does not mandate that users of this system enforce



these guidelines. For instance, a student could be purchasing more than one snack during or after school, thus overshooting the calorie restrictions for their age group by consuming multiple snacks.

The parties eligible for the CACFP Snack Guidelines are purportedly participating in an attempt to meet the minimum needs of nutritionally at-risk students in their schools and programs. Therefore, this program supplies *no less* than the serving sizes and food combinations stated in the guideline. On the other hand, the AHG purportedly aims to combat childhood obesity in the United States, which guides their restrictive guidance approach. In this case, the program supplies *no more* than the serving sizes and nutrient limits stated in the guideline. While the programs differ in their intent regarding nutrient consumption, research aimed at evaluating nutrients delivered by these programs seems warranted.

#### *Funding and partnerships*

The CACFP does not identify any partnerships outside of the federal sphere (USDA, FNS, Dietary Guidelines for Americans), while the AHG maintains and promotes their private funding and collaborations with corporate food manufacturers and other food companies. In an article published on May 18<sup>th</sup>, 2012, The AHG announced that more than 70 beverage, food and health insurance companies have partnered with the organization. Familiar names include Owens Corning, Kraft Foods, Mars, Campbell Soup Company, Coca-Cola Company, ConAgra Foods, Inc., Del Monte, Nationwide Children's Hospital, PepsiCo, Snack Food Association and Weight Watchers (22). In addition, it is interesting that the Snack Food Association (SNA) has made it to the 2012 list of partnering groups. In 2006, this was the perspective of the SNA on the AHG

Program:

While supportive of the Alliance's direction with the voluntary Guidelines for Competitive Foods, SNA is concerned that the lack of enforcement, multiple calorie and grade level distinctions, and other aspects of the guidelines will make nationwide implementation at the local level difficult for school administrators, school foodservice personnel, student groups and others that purchase foods for sale on school campuses.

Perhaps after seeing the expansion of the AHG program, the SNA had a change of heart. Nonetheless, this ever-growing list of corporate partnerships and the promotion of easily accessible processed food products demonstrates a move away from the USDA's emphasis on whole foods as a part of a healthy diet.

#### *Nutrient criteria*

The AHG includes strict calorie and nutrient restrictions for total fat, saturated fat, trans fat and sugar in their program. Participation and adherence to their guidelines is voluntary. As a result, these criteria will limit the calorie, fat, sugar intake in children, provided they are only choosing one snack per day and choosing these "healthy" snacks over others which may still be available in school stores and vending machines.

In contrast, the CACFP does not to include calorie and nutrient restrictions for their four food groups or provide a discrete list of products to choose from. A wide range of acceptable products is included, with notable differences in nutrient profiles. This lack of nutrient specificity enables delivery of snacks that may exceed nutrient needs of children served. However, that a timely review of the CACFP produced by the

Committee to Review CACFP Meal Requirements has proposed a renovated guidance program that includes such specifications. These new elements and guidelines are designed to be more consistent with the 2010 Dietary Guidelines and include a focus on providing whole grains, ensuring students receive adequate servings of all food groups per week and restricting nutrients such as sugars, fats and sodium. Specific recommendations include (15):

- c. At least half of the grains/breads served in meals and snacks must be whole grain-rich, meeting the definition given in the table of proposed food specifications (Table 7-8). Other grain/bread must be enriched. Providers are encouraged to gradually increase the proportion of grain foods that are whole grain-rich to well above half of the grain foods and to include 100 percent whole grain foods often.
- d. Each morning and afternoon snack will provide two different food components in a serving size tailored to the age group's needs; over the course of a 5-day week, the food components provided will include two servings of fruit, one serving of an orange vegetable, one serving of a non-starchy vegetable, two servings of grain/bread, two servings of lean meat or meat alternate, and two servings of low-fat or nonfat milk.
- e. The amounts of solid fats, added sugars, trans fats, and sodium are to be limited in all meals and snacks. For example, milk and yogurt must be low fat or nonfat for those ages 2 years or older (whole milk for 1-year-old children), meats must be lean, fruits and juices must be free of added sugars, foods with nutritional labels must be labeled as containing zero

grams of trans fat, and foods high in added sugars and/or sodium are to be served infrequently, if at all. (15)

These recommendations differ greatly from the current CACFP requirements and are more consistent with the newly established 2010 Dietary Guidelines. Within this proposal, there is also an emphasis on weekly menu planning that would help providers fulfill the guidelines outlined above and make specific selections so that food groups and snack selections vary across the days of the week. For snacks, the new requirements specify that an individual can either choose between two small snacks or one “enhanced” snack per day (15). Overall, these suggested changes could facilitate delivery of weekly nutrient and food group goals and healthier snacks for child participants.

#### Evaluation of Nutrient Composition of CACFP Snack Groups

The calories and nutrients provided by the six different CACFP groups vary significantly. This may present a problem because in facilities which may not be able to produce a variety of snack items throughout the week. The repetition of a snack item throughout the week or school year may then result in an unbalanced nutrient and/or calorie intake by the children participating in the CACFP snack food program. For example, if a student were receiving a slice of white bread and cup of peaches in heavy syrup as a snack each day of the week, they would be receiving much more sugar and less vitamin D, calcium, protein and fiber than if they were receiving various and/or more nutrient dense snacks throughout the school week. Further assessment of the foods provided by institutions participating in the CACFP is necessary to get a clear picture of what at-risk children are receiving as “snacks.”

### *Limitations*

There are limitations to this study that must be considered when reviewing the results. It is important to note that to this author's knowledge, this is the first attempt to describe differences existing between snack food guidance programs.

The researcher purposefully selected two snack food guidelines for this mixed methods comparison based on their breadth in K-12 schools in the U.S. and status as government and non-government programs. Results from these two guidance programs cannot be generalized to every government and non-government snack food program in the United States.

In the quantitative investigation of CACFP snack food nutrient composition, the snack foods analyzed were chosen non-randomly in order to fit the listed food groups and serving sizes outlined in the guidance program. The snack items selected may not be representative of the snack items actually supplied to children in eligible programs. A survey of snack food purchasing in participating schools is necessary to pinpoint a representative sample of snack foods provided to at-risk children.

### *Implications for Further Research*

A comparison of snack food products offered by AHG vs. CACFP seems warranted. This could include an investigation of how each program complies with the 2010 Dietary Guidelines for Americans.

Another area of investigation may be schools' adherence to AHG since schools are not legally or contractually bound to uphold the guidelines provided by this non-government program. In addition, it would be beneficial to gather data on the snack foods

actually provided to children by at-risk facilities participating in the CACFP.

Furthermore, research regarding how a school may use AHG-suggested products to fulfill CACFP guidelines in facilities with limited or no kitchens may be warranted. For those schools that cannot provide whole food products, they may have to rely on pre-packaged processed food products.

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